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10/581,074	05/31/2006	Markus Rosch	291261US0PCT	2085
22850	7590	10/23/2007	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.			CHANDRAKUMAR, NIZAL S	
1940 DUKE STREET			ART UNIT	PAPER NUMBER
ALEXANDRIA, VA 22314			1625	
			NOTIFICATION DATE	DELIVERY MODE
			10/23/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/581,074	Applicant(s) ROSCH ET AL.	
	Examiner Nizal S. Chandrakumar	Art Unit 1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-23 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

This application filed 05/31/2006 is a 371 of PCT/EP04/13811 12/04/2004.

Claims 1-23 are before the Examiner.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-23 rejected on the ground of nonstatutory ^{obviousness type} double patenting over claims 1-30 of U. S. Patent No. 7271299 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: The claims of the instant case and the claims of the issued patent are drawn to the hydrogenation of MA, in a two stage process using similar copper based catalyst, optionally removing the succinic anhydride if necessary. The difference is that in the instant case, the reaction parameters (pressure and temperature) are adjusted conducive to the formation of THF. In the case of the issued patent, the parameters are adjusted to the formation of BDL. One skilled in the art attempting to make THF would be motivated to optimize the reaction parameters such as pressure and temperature of the process of the issued patent, because it is well known in the art that the elimination the elements of water (from BDO and diol in

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general) is favored at higher temperatures; the process of the instant applications would have been suggested.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 19 and dependent claims are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites 'an oxide having acidic sites'. It is unclear what the oxides are. Claim 19 recites 'metals or a compound thereof, from the group consisting of the elements of Groups I to 14 of the periodic table. It is unclear what compounds and metals applicable for the process that the applicant is seeking protection for.
3. Claim 1 second page, line 3-4: In the context of the working example in the specification, it appears that the products of the first stage of hydrogenation are recycled optionally into the same reactor. Thus it is unclear what the 'two zones' in the claim refer to, because if the two zones refer to different temperature zones in the same reactor, it is unclear what the first reactor (claim 6) and the second reactor (claim 7) relate to. In general, it appears that the claims are drawn to two reactors operating in series; however, the specification refers to one apparatus. Appropriate clarification is suggested (also see below).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 and dependent claims are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the production of mixture of BDO, GBL and THF, does not reasonably provide enablement for how to vary the ratio of these products 'only by varying the temperature in the two hydrogenation zones' as claimed in step e) of claim 1. Further, the specification does not enable the separation by distillation of these products as per step e). The specification contains information on the GC measurement of ratios in the effluent gas but it is not enabling for the practical separation of the products. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. Enablement is considered in view of the Wands factors (MPEP 2164.01 (a)). These include: (1) breadth of the claims; (2) nature of the invention; (3) state of the prior art; (4) amount of direction provided by the inventor; (5) the level of predictability in the art; (6) the existence of working examples; (7) quantity of experimentation needed to make or use the invention based on the content of the disclosure; and (8) relative skill in the art. All of the factors have been considered with regard to the claim, with the most relevant factors discussed below.

The claims are drawn to the (production of) setting the ratio of the products, THF, GBL and BDO, relative to one another within the range from 10 to 100% by weight of THF, from 0 to 90% by weight of GBL and from 0 to 90% by weight of BDO only by varying the temperatures in the two hydrogenation zones and also if appropriate the GBL recycle stream.

This product distribution (ratio) is wide, one that is not supported by the specification. Dehydration to THF, as expected, is predominant at higher temperatures, but the formation of BDO is limited to 40 mol% at the lowest temperature of 180°C. For instance, it is unpredictable if further lowering of the temperature would provide any reduction product at all. As such, the process is not amenable to production of 'defined mixtures' as presently claimed. Likewise, based on the working examples provided on page 18-21, the

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product distribution is limited to narrow ranges, and is not in line with the instantly claimed wide range.

There is one working example for the preparation of the catalyst. As to the composition of the catalyst, the working example is limited to Cu and Zn oxide mixture with Alumina based catalyst for acidic sites.

Thus the specification is not enabling for all the possible metals and metal oxides of the Group 1 to 14 of the periodic table.

In addition, the description of the hydrogenation apparatus on page 17 of the specification is unclear since no figures or drawing is provided. Because of this, it is unclear how the recycling, separation of SA and distillation of the products are accomplished.

Example on page 20 provides the product distribution as ascertained by GC, but it is not seen where the specification discloses method for separating the products.

There is a substantial gap between the process described and what is being claimed. In order to utilize the invention as claimed, the skilled artisan would be presented with an unpredictable amount of experimentation with regard to catalyst selection, design of apparatus, temperature and pressure of the reaction conditions. Consequently, a burdensome amount of research would be required by one of ordinary skill in the art to use the invention commensurate with the scope of the claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bertola et al. (US 6248906).

The claims are drawn to hydrogenation of C4 dicarboxylic acids or derivatives thereof in the gas phase to provide mixtures of optionally substituted BDO, THF and GBL in variable proportions, using oxides of copper and metal oxide having acidic sites as catalysts in a two stage process. Bertola et al. teach the same process for the production of BDO, THF and GBL starting from maleic anhydride esters, consisting of two subsequent hydrogenations.

The difference with respect to catalyst employed, is that in the instant case a wide variety of possible catalysts are claimed including the catalysts of the prior art. In addition, the prior art uses esters of maleic acids rather than maleic anhydride as starting material. In the prior art, the first stage of the hydrogenation using Pd results in succinic acid esters. Thus, the succinic anhydride is hydrogenated to THF, BDL and GBL in the instant case and succinic esters are hydrogenated to THF, BDL and GBL in the instant case. The prior art also differs slightly in the operating parameters such as temperature and pressure for the hydrogenation reactions.

However, optimizing reaction parameters such as temperatures, pressures etc are within the routine nature in the practice of chemical process development. Further, the prior art states, column 2 line 42-45, 'pressure and temperature in the primary hydrogenation, as well as residence times on the catalyst can be optimized depending on the proportions between the GBL and THF to be produced'.

With regard to optimization within prior art conditions or through routine experimentation, MPEP states,

Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US 6730800, US 6958404, US 7154011 and US 7271299.

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No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nizal S. Chandrakumar whose telephone number is 571-272-6202. The examiner can normally be reached on 8.30 am - 5 pm Monday- Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Andres can be reached at 571-272-0867 or Primary Examiner D. Margaret Seaman can be reached at 571-272-0694. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Nizal S. Chandrakumar



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